Agilent N9360A
Mobile Station Tester

Technical Overview

Agilent Technologies

Go/No go multi-format cellular device tester for mobile station service and repair with built-in PC

When your cellular phone repair, manufacturing, or R&D testing needs require cost-effective mobile device parametric and call processing measurements, use the Agilent N9360A mobile station tester.

This low-cost, go/no-go tester provides "just enough" capability to make it easy to evaluate protocol as well as RF transmitter and receiver performance. User-friendly, automated test operations enable phone test by operators with little or no technical expertise. The N9360A is an ideal solution for "quick check" call testing in R&D and basic calibration testing in manufacturing

The lightweight N9360A has an internal PC controller with LAN and GPIB connectivity. Test measurements display on the N9360A screen and can be stored as .csv files in a thumb drive, or printed on an Epson PM-G800 printer. Upgradeable hardware and firmware facilitates adding new wireless technologies to support next generation networks.

The N9360A is designed to help you meet your time-to-market goals, keep production costs low, and provide a platform that can change with the market.

Key Features

- Multi-format test
  - GSM/GPRS/EGPRS
  - W-CDMA
  - HSDPA
  - Cdma2000®
  - 1xEV-DO
- Quad-band GSM/GPRS/EGPRS
- SMS test
- W-CDMA Bands I to VI
- Twelve traffic-channel test in automatic mode
- ACLR and SEM measurement capability[1]
- FM (frequency modulation) capability[1]
- Receiver sensitivity support in GPRS ETSI A and ETSI B mode
- Support for EGPRS SRB loopback BLER

Avoid testing interference from real networks with a fully automated test system

The Agilent GS-8210 system is a pre-configured test system which combines the N9360A mobile station tester with the N9360A-S01 shield box and Agilent N9360A-W36 GS-8210 multi-format test software - offering a cost effective functional test system designed for cellular phone inspection and repair.

Figure 1. GS-8210 test system with N9360A, shield box, and test software

[1] Requires N9360AU-100 hardware installed in unit

Technical Specifications

Specifications describe the test set's warranted performance and are valid over the entire operation and environmental ranges unless otherwise noted.

Supplemental characteristics are intended to provide additional information useful in applying the instrument by giving typical, but non-warranted performance parameters. These characteristics are shown in *italics* and labeled as *typical*, or *supplemental*.

GSM/GPRS/EGPRS

	Frequency (MHz)	
Band	**Uplink**	**Downlink**
GSM850	824 ~ 849	869 ~ 894 (867 ~ 896)[1]
GSM900	876 ~ 915	921 ~ 960 (921 ~ 962)[1]
DCS1800	1710 ~1785	1805 ~ 1880 (1802 ~ 1884)[1]
PCS1900	1850 ~1910	1930 ~ 1990 (1927 ~ 1994)[1]

W-CDMA/HSDPA

	Frequency (MHz)	
Band	**Uplink**	**Downlink**
Band I	1920 ~ 1980	2110 ~ 2170
Band II	1850 ~ 1910	1930 ~ 1990
Band III	1710 ~ 1785	1805 ~ 1880
Band IV	1710 ~ 1770	2110 ~ 2170
Band V	824 ~ 849	869 ~ 894
Band VI	830 ~ 840	875 ~ 885
Band VIII	880 ~ 915	925 ~ 960
Band IX (Japan)	1749.9 ~ 1784.9	1844.9 ~ 1879.9

cdma2000/1xEV-DO

	Frequency (MHz)	
Band	**Reverse**	**Forward**
Band 0 (Cell US)	815 ~ 849	869 ~ 894
AWS-1	1710 ~ 1755	2110 ~ 2155
Band 1 (PCS US)	1850 ~1910	1930 ~ 1990
Band 3 (Cell Japan)	887 ~ 889 893 ~ 901 915 ~ 925	832 ~ 834 838 ~ 846 860 ~ 870
Band 4 (PCS Korea)	1750 ~ 1780	1840 ~ 1870
Band 6 (IMT-2000)	1920 ~ 1980	2110 ~ 2170

GSM/GPRS/EGPRS

Peak Tx Power Measurement

Range: –20 to +39 dBm
Resolution: 0.1 dB
Accuracy: ≤ ±1.0 dB (25 ±5 °C), *typical = ±0.5*
≤ ±1.5 dB (0 to 50 °C)

Power Ramp

Range: –20 to +39 dBm
Resolution: 0.1 dB
Accuracy: ≤ ±1.0 dB (25 ±5 °C), ≤ ±1.5 dB (0 to 50 °C)
Range for display:
Vertical: 80 dB
Horizontal: zoom off –9.25 to +156.25 bits, zoom on –8.00 to +2.00 bits, +145.00 to +155.00 bits

Frequency Error Measurement

Range: 0 to ±60 kHz
Resolution: 1 Hz
Accuracy: ≤ ± (10 + reference signal) Hz
Input level: –5 to +39 dBm

Burst Timing

Range: –20 to +20 deg
Resolution: 0.1 deg
Accuracy:
GSM850, GSM900: ≤ ±1.0 deg rms
DCS1800, PCS1900: ≤ ±1.5 deg rms
GSM850, GSM900: ≤ ±4.0 deg peak
DCS1800, PCS1900: ≤ ±6.0 deg peak
Input level: –5 to +39 dBm

Rx Quality

Range: 0 to +7
Resolution: 1

Actual Timing Advance

Range: 0 to +63 bits
Resolution: 1 bit

EVM Measurement (EGPRS 8PSK)

Range: 0 to 10%
Resolution: 0.01%
Residual EVM: ≤ 3.8%
Input level: –5 to +39 dBm

Origin Offset Measurement (EGPRS 8PSK)

Range: ≥ 20 dB
Resolution: 0.01 dB
Residual EVM: ≥ 40 dB
Input level: –5 to +39 dBm

Spectrum Monitor

Range: –11 to +39 dBm
Span: fc to fc+400 kHz, fc±100 kHz
RBW: 10 kHz, 30 kHz
Range for display:
Span fc to fc+400 kHz ,level 80; fc±100 kHz, level 80
Accuracy: ≤ ±2 dB
Resolution: 0.1 dB
Noise level: ≤ –35 dB (Pin = ±29 dBm)

[1] Requires N9360AU-100 hardware installed in unit

W-CDMA/HSDPA

Modulated Power Measurement

Range: 0 to +36 dBm; (-30 to +36 dBm)[1]
Resolution: 0.1 dB
Accuracy: ≤ ±0.7 dB (25 ±5 °C), *typical = ±0.4*
≤ ±1.0 dB (0 to 50 °C)

Range: –53 to –0.01 dBm; (-60 to -30.01dBm)[1]
Resolution: 0.1 dB
Accuracy: ≤ ±1.0 dB (25 ±5 °C), *typical = ±0.5*
≤ ±1.5 dB (0 to 50 °C)

Range: –60 to –53.01 dBm; (-70 to -60.01dBm)[1]
Resolution: 0.1 dB
Accuracy: ≤ ±1.5 dB (25 ±5 °C), *typical = ±0.8*
≤ ±2.0 dB (0 to 50 °C)

Frequency Error Measurement

Range: 0 to ±500 Hz
Resolution: 0.1 Hz
Accuracy: ≤ ± (10 + reference signal) Hz
Input level: –20 to +36 dBm (–30 to +36 dBm)[1]

EVM Measurement

Range: 0 to 20%
Resolution: 0.01%
Residual EVM: ≤ 3.8%
Input level: –20 to +36 dBm; (–30 to +36 dBm)[1]

ACLR Measurement

Input level: –5 to +36 dBm
Range: 0 to –40 dB (at ±5 MHz), 0 to –48 dB (at ±10 MHz)
(≤–43 dB (at ±5 MHz) and ≤–53 dB (at ±10 MHz))[1]
Resolution: 0.01 dB

SEM Measurement [1]

Range: –5 to +36 dBm
Margin: > 7.7 dB

OBW Measurement

Input level: –5 to +36 dBm
Accuracy: < ±100 kHz
Range: 0.00 to 9.99 MHz
Resolution: 0.01 MHz

Sensitivity/BER

Input level: –20 to +36 dBm
Range:
PN9: 0.00 to 25.00%
PN15: 0.00 to 33.33%

Origin Offset Measurement

Range: ≤ –10%
Resolution: 0.01%
Residual EVM: ≤ –50%
Input level: –20 to +36 dBm

[1] Requires N9360AU-100 hardware installed in unit

cdma2000/1xEV-DO

Modulated Power Measurement

Range: –53 to +36 dBm; (–60 to +36 dBm)[1]
Resolution: 0.1 dB
Accuracy: ≤ ±1.0 dB (25 ±5 °C), ≤ ±1.5 dB (0 to 50 °C)

Range: –60 to –53.01 dBm; (–70 to –60.01 dBm)[1]
Resolution: 0.1 dB
Accuracy: ≤ ±1.5 dB (25 ±5 °C), ≤ ±2.0 dB (0 to 50 °C)

Frequency Error Measurement

Range: –10 to +10 kHz
Resolution: 0.1 Hz
Accuracy: ≤ ± (30 + reference signal) Hz,
Input level: –20 to +36 dBm; (–30 to +36 dBm)[1]

Origin Offset Measurement

Range: ≤ –20%
Resolution: 0.01%
Input level: –20 to +36 dBm

Time Offset Measurement

Range: –10 to +10 µSec
Resolution: 1/8 chip
Input level: –20 to +36 dBm

Access Probe Power Measurement

Resolution: 0.01%
Input level: –40 to +36 dBm

Code Power Measurement

Accuracy: ≤ ±2.0 (0 to 36 dBm), ≤ ±4.0 (–20 to –0.01 dBm)
Resolution: 0.1 dB
Input level: –20 to +36 dBm

RF Signal Generator for GSM/GPRS/EGPRS

Frequency step (MODEM): 0.1 kHz (Range: carrier < ±200 kHz)
Modulation:
GMSK (B.T=0.3), 8PSK, OFF (CW)
Output power accuracy

≤ ±1	–110.0 to –50.0 dBm (25 ±5 °C)
≤ ±1.5 dB	–50.0 to –20.0 dBm (25 ±5 °C)
≤ ±1.5	–110.0 to –50.0 dBm (0 to 50 °C)
≤ ±2.0 dB	–50.0 to –20.0 dBm (0 to 50 °C)

Output power accuracy [1]

≤ ±1	–120.0 to –50.0 (25 ±5 °C)
≤ ±1.5 dB	–50.0 to –10.0 dBm (25 ±5 °C)
≤ ±1.5	–120.0 to –50.0 dBm (0 to 50 °C)
≤ ±2.0 dB	–50.0 to –10.0 dBm (0 to 50 °C)

Phase error (GMSK: ≤ 5 deg. RMS, ≤ 15 deg. Peak
(≤ 3 deg. RMS, ≤ 9 deg. Peak)[1]
Modulation accuracy (8PSK): ≤ 12.5 % RMS; (≤ 7.0 % RMS)[1]
Power level step: 0.1 dB

Power level range

Auto/Man: –110.0 to –50.0 dBm in 0.1 dB steps
(–120.0 to –50.0 dBm in 0.1 dB steps)[1]
Tx analyzer: –110.0 to –50.0 dBm in 0.1 dB steps
(–120.0 to –50.0 dBm in 0.1 dB steps)[1]
SG: –110.0 to –20.0 dBm in 0.1 dB steps
(–120.0 to –10.0 dBm in 0.1 dB steps)[1]
Off: < –120 dBm; (–130 dBm)[1]

[1] Requires N9360AU-100 hardware installed in unit

RF Signal Generator for W-CDMA/HSDPA

Modulation: W-CDMA: QPSK, Off: CW, FM[1]
FM Modulation[1]: Rate = 50kHz, Deviation = 500kHz
Modulation accuracy: QPSK ≤ 12.5% rms; (QPSK ≤ 10.0% RMS)[1]
Output power accuracy:
≤ ±1 –115.0 to –50.0 dBm (25 ±5 °C)
≤ ± 1.5 –50.0 to –18.0 dBm (25 ±5 °C)

≤ ± 1.5 –115.0 to –50 dBm (0 to 50 °C)
≤ ± 2.0 –50.0 to –18.0 dBm(0 to 50 °C)

Output power accuracy:[1]
≤ ±1 –120.0 to –50.0 dBm (25 ±5 °C)
≤ ± 1.5 –50.0 to –15.0 dBm (25 ±5 °C)
≤ ± 2.0 –15.0 to –10.0 dBm (25 ±5 °C)

≤ ± 1.5 –120.0 to –50 dBm (0 to 50 °C)
≤ ± 2.0 –50.0 to –15.0 dBm (0 to 50 °C)
≤ ±2.5 –15.0 to –10.0 dBm (0 to 50 °C)

Frequency:
Band I: 2110 to 2170 MHz
Band II: 1930 to 1990 MHz
(1932.5, 1937.5, 1942.5, 1947.5, 1952.5, 1957.5, 1962.5, 1967.5, 1972.5, 1977.5, 1982.5, 1987.5)
Band III: 1805 to 1880 MHz
Band IV: 2110 to 2170 MHz
Band V: 869 to 894 MHz
(871.5, 872.5, 876.5, 877.5, 882.5, 887.5)
Band VI: 875 to 885 MHz, (877.5, 882.5)
Power level step: 0.1 dB
Power level range:
Mod: –115.0 to –18.0 dBm in 0.1 dB steps
(–120.0 to –15.0 dBm in 0.1 dB steps)[1]
CW: –115.0 to –18.0 dBm in 0.1 dB steps
(–115.0 to –15.0 dBm in 0.1 dB steps)[1]
Off: ≤ –120.0 dBm; (–130.0 dBm)[1]

RF Signal Generator for cdma2000

Modulation: CDMA, Off: CW
Modulation accuracy: > 0.990
Output power accuracy
≤ ±1 –115.0 to –53.0 dBm (25 ±5 °C)
≤ ± 1.5 –52.9 to –18.0 dBm (25 ±5 °C)

≤ ± 1.5 –115.0 to –53 dBm (0 to 50 °C)
≤ ± 2.0 –52.9 to –18.0 dBm (0 to 50 °C)

Output power accuracy:[1]
≤ ±1 –120.0 to –50.0 dBm (25 ±5 °C)
≤ ± 1.5 –49.9 to –15.0 dBm (25 ±5 °C)

≤ ± 1.5 –120.0 to –50 dBm (0 to 50 °C)
≤ ± 2.0 –49.9 to –15.0 dBm (0 to 50 °C)
≤ ±2.5 –14.9 to –10.0 dBm (0 to 50 °C)

Frequency:
Band 0: 860 to 894 MHz
Band 1: 1930 to 1990 MHz
Band 3: 832 to 834 MHz, 838 to 846 MHz
860 to 870 MHz
Band 4: 1840 to 1870 MHz
Band 6: 2110 to 2170 MHz
Power level step: 0.1 dB
Power level range:
Mod: –115.0 to –18.0 dBm in 0.1 dB steps
(–120.0 to –10.0 dBm in 0.1 dB steps)[1]
CW: –115.0 to –18.0 dBm in 0.1 dB steps
(–120.0 to –10.0 dBm in 0.1 dB steps)[1]
Off: ≤ –120.0 dBm; (–130.0 dBm)[1]

[1] Requires N9360AU-100 hardware installed in unit

GSM/GPRS/EGPRS Test Coverage

GSM Transmitter Tests
- Phase and frequency error
- Tx output power (normal burst)
- Monotonic power sequence
- Power vs time (burst timing) (normal burst)
- ORFS (output RF spectrum) due to modulation
- ORFS due to switching

GPRS Transmitter Tests
- Phase and frequency error in GPRS multislot configuration
- Tx output power in GPRS multislot configuration (normal burst)
- Monotonic power sequence in GPRS configuration
- Power vs time (burst timing) in GPRS configuration (normal burst)
- ORFS (output RF spectrum) due to modulation in GPRS multislot configuration
- ORFS due to switching in GPRS multislot configuration

EGPRS Transmitter Tests
- Frequency error in EGPRS configuration
- Modulation accuracy in EGPRS configuration
- EGPRS transmitter output power
- ORFS (output RF spectrum) due to modulation in EGPRS configuration
- ORFS due to switching in EGPRS configuration

GSM Receiver Tests
- Reference sensitivity, TCH/FS
- Signal strength

GPRS Receiver Tests
- Minimum input level for reference performance for GPRS operation

EGPRS Receiver Tests
- Minimum input level for reference performance for EGPRS operation

Receiver Signal Reporting
- Signal strength
- Signal quality under static conditions TCH/FS no DTX

Short Message Service (SMS)
- SMS mobile terminated
- SMS mobile originated
- SMS cell broadcast

HSDPA Test Coverage

HSDPA
- Through R
- Median CQI
- CQI variance
- BLER

W-CDMA FDD Test Coverage

W-CDMA Transmitter Characteristics
- Maximum output power (Tx power)
- Frequency error
- Open loop power control in the uplink
- Inner loop power control in the uplink
- Minimum output power
- Occupied bandwidth (OBW)[1]
- Adjacent channel leakage power ratio DSB (ACLR)[1]
- Adjacent channel leakage power ratio (ACLR)[1, 2]
- Spectrum emission mask[2]
- Error vector magnitude

W-CDMA Receiver Characteristics
- Reference sensitivity level
- Maximum input level

Short Message Service (SMS)
- SMS mobile terminated
- SMS mobile originated

[1] Manual mode only

[2] Requires N9360AU-100 hardware installed in unit

GSM/GPRS/EGPRS/W-CDMA Test Features

GSM
- Location update
- MS call
- BS call
- MS release
- BS release
- TCH loop
- Voice loopback
- Emergency call
- Handover
- Short message service

GPRS
- Attach
- Detach
- Handover

EGPRS
- Attach
- Detach
- Handover

W-CDMA
- Registration
- UE origination call
- UE termination call
- BS call (RMC)
- BS call (AMR)
- BS release
- Voice (AMR) loopback
- RMC test loopback
- Handover

cdma2000 Test Coverage

Protocol Test
- Location update
- MS call
- MS release
- BS call (talk)
- BS call (RF test)
- BS release
- Talk (loopback voice)
- Softer handoff
- Hard handoff
- Band handoff

RF Test (Automatic Test)
- Access probe power
- ILP
- Max Tx power
- Min Tx power
- Frequency error
- Multi code rho
- Time offset
- Sensitivity/FER

RF Test (Manual Test)
- Tx power
- Frequency error
- Rho/multi code rho
- Origin offset
- Time offset
- FER
- Max Tx power
- Min Tx power
- Code power pilot
- Code power traffic (fundamental)
- Pilot strength
- Access probe power

1xEV-DO Test Features

Protocol Test

- UATI assignment
- Session opened
- BS call
- RF test
- Softer handoff
- Connection close
- Session close

RF Test (Automatic Test)

- Access probe power
- ILP
- Max Tx power
- Min Tx power
- Frequency error
- Multi code rho
- Time offset
- Sensitivity/PER1
- Sensitivity/PER2
- Sensitivity/PER3

RF Test (Manual Test)

- Tx power
- Frequency error
- Multi code rho
- Origin offset
- Time offset
- PER
- Max Tx power
- Min Tx power
- Code power

Physical Specifications

Dimension: 145 x 330 x 373 mm (H x W x D)
Weight: 9 kg
Voltage: 80 to 240 Vac, 1 Φ
Power line frequency: 50/60 Hz
Power: 160 W

Internal Timebase

Output frequency: 10 MHz
Output Impedance: 50 ohm (typically)
Reference accuracy: 0.06 ppm/2 year

Ordering Information

N9360A Mobile Station Tester

N9360A Options

Option 010	Support GSM/GPRS
Option 011	Support GSM/GPRS/EGPRS
Option 020	Support cdma2000
Option 022	Support cdma2000/1xEV-DO
Option 023	Support GSM/GPRS/cdma2000
Option 030	Support W-CDMA
Option 032	Support W-CDMA/cdma2000
Option 033	Support W-CDMA/cdma2000/1xEV-DO
Option 034[1]	Support GSM/GPRS/EGPRS/W-CDMA
Option 035	Support GSM/GPRS/EGPRS/W-CDMA/ cdma2000/1xEV-DO
Option 036	Support GSM/GPRS/EGPRS/W-CDMA/cdma2000
Option 051	Support GSM/GPRS/W-CDMA/HSDPA
Option 052	Support GSM/GPRS/EGPRS/W-CDMA/HSDPA
Option 053	Support GSM/GPRS/EGPRS/W-CDMA/HSDPA/ cdma2000/1xEV-DO
Option W36	Test software to support GSM/GPRS/EGPRS/ W-CDMA/HSDPA/cdma2000/1xEV-DO
Option S01	RF shielded test chamber with 2 x N-type connector
Option S02	RF shielded test chamber with 2 x N-type connector and USB connector
Option S03	RF shielded test chamber with 2 x N-type connector and D-SUB 25 connector
Option S04	RF shielded test chamber with 2 x N-type, USB and D-SUB 25 connector
Option C01[2]	RF cable option (1 meter)
Option C02	GPIB cable option (1 meter)
Option C03	USB/GPIB interface to control GPIB instruments over USB
Option C04	RS232 serial cable
Option C05	LAN crossover cable
Option C06[2]	EF400 RF cable (1 meter)
Option A01	Additional test USIM
Option A02	Additional antenna coupler
Option U010[3]	GSM/GPRS upgrade kit
Option U020[4]	cdma2000 upgrade kit
Option U021[3]	1xEV-DO upgrade kit
Option U023[4]	cdma2000/1xEV-DO upgrade kit
Option U030[3]	W-CDMA upgrade kit (for N9360A-02x)
Option U031[3]	W-CDMA upgrade kit (for N9360A-01x)
Option U032[3]	HSDPA upgrade kit
Option U100[4]	N9360A **B version** upgrade kit

[1] Include 1 x Test USIM and 1 x antenna coupler
[2] Recommended to pick with RF shielded test chamber
[3] Field upgradeable
[4] Return to factory for upgrade

Remove all doubt

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements.

Agilent offers a wide range of additional expert test and measurement services for your equipment, including initial start-up assistance onsite education and training, as well as design, system integration and product management.

For more information on repair and calibration services, go to:

www.agilent.com/find/removealldoubt

Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

Agilent Direct

www.agilent.com/find/agilentdirect
Quickly choose and use your test equipment solutions with confidence.

www.agilent.com
www.agilent.com/find/N9360A

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:
www.agilent.com/find/contactus

Americas	
Canada	(877) 894-4414
Latin America	305 269 7500
United States	(800) 829-4444
Asia Pacific	
Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Thailand	1 800 226 008
Europe & Middle East	
Austria	01 36027 71571
Belgium	32 (0) 2 404 93 40
Denmark	45 70 13 15 15
Finland	358 (0) 10 855 2100
France	0825 010 700* *0.125 €/minute
Germany	07031 464 6333** **0.14 €/minute
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
Switzerland	0800 80 53 53
United Kingdom	44 (0) 118 9276201

Other European Countries:
www.agilent.com/find/contactus
Revised: July 17, 2008

Product specification and descriptions in this document subject to change without notice.

cdma2000 is a registered certification mark of the Telecommunications Industry Association. Used under license.

© Agilent Technologies, Inc. 2008
Printed in USA, October 1, 2008
5989-9559EN

Agilent Technologies